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Andersson

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(54) **METHOD AND A DEVICE FOR THE
MANUFACTURING OF WASHERS FOR
LOCKING AND WASHER FOR LOCKING**

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(56) **References Cited**

U.S. PATENT DOCUMENTS

414,109 A * 10/1889 Facer 72/356

653,084 A * 7/1900 Hart 470/41

(Continued)

FOREIGN PATENT DOCUMENTS

CN 1256980 A 6/2000

CN 1309592 A 8/2001

(Continued)

OTHER PUBLICATIONS

Chinese Office Action of corresponding Chinese Application No.
200880108846.X, dated Feb. 3, 2012.

(Continued)

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(57)

ABSTRACT

A method for the manufacturing of circular washers for locking from blanks, a washer having a central hole, a first side comprising a pattern of radially extending teeth and a second side comprising a pattern of radially extending cams. The method is especially comprised in the steps of producing a washer blank having an annular shape; introducing the washer blank into a die assembly for forming a closed shaping space by a lower die portion, an opposing upper die portion, a central die portion and a support piece, the central die portion extending through a washer blank central hole; forming the blank to a washer by mutual movement of said lower and upper die portions; and opening the closed shaping space to extract the formed washer. The invention also relates to a device and a washer.

10 Claims, 3 Drawing Sheets

